

Physics 11 Honours – Activity on 2nd Class – Investigating Periodic events

Equipment – String, stopwatch, 200g mass, meter stick, masking tape

Note: Technical term for “the amount of time for one complete cycle” = **Period**

1. Experimental Design:
 - a. With your group (maximum 3 people) develop a method for measuring the time for one full swing (cycle) of the pendulum, with the greatest accuracy and precision possible (with the given equipment). **Hint: in order to increase accuracy and precision of your results, you should not try to measure the time for one single cycle (due to experimental error resulting from the limits of human reaction time when starting and stopping the stopwatch). So, what should you do? How many cycles should you time?*
 - b. List the variables and values that seem important (e.g. mass, length, height from which the pendulum was dropped).
 - c. **Explain** your procedure in words and **show** with diagrams.
2. Perform the experiment and record your results. Do multiple trials, and record your results in a data table. Are the results of your trials consistent?
3. Perform the experiment again, but with a larger mass. You may wish to try 3 or 4 different masses to assess whether or not mass has an effect on the time for one cycle (period).
4. Finally, perform the experiment again with the 200g mass, but this time use different lengths of string. Does the time for one cycle (period) depend on string length?
5. **Sources of error:** (explain in full sentences) List all the factors that you can think of that limit your ability to measure with perfect accuracy and precision.
6. **Analysis:** List the variables that you investigated.
 - a. Which variable(s) appear to be key in determining the **period** of the pendulum (independent variable)? (dependent variable = the time for one cycle).
 - b. Complete the sentence, “*The time for one cycle depends on the _____ of the pendulum*”.
 - c. Verify your statement with experimental data to both confirm the important variable(s) and disconfirm the other(s).